

the soil. As the growing crop can only use such materials as are already in, or can be reduced to a soluble state, whatever can conduce to the state of solution, will benefit them. The finer the grains of sand, the more easily they are acted on by atmospheric agency, and the more speedily will they yield whatever substances they may contain. But there is another, and a very great difference in the value of coarse and fine sand. A large part of the food of plants is derived from the atmosphere. This food must be absorbed wholly by the soil, in the early growth of the plant; and if the soil has not the power of absorption, the plant will pine, languish and die, unless it be supported by applied manures. Sand, in a very fine state of division, has powerful absorbent qualities, it absorbs and retains atmospheric food for plants, and to a very great extent, supplies the place of alumina (clay), the peroxyd of iron, and vegetable matter, which are famous for this property.

IRON.—Another constituent of soils is *iron*.

It always is present, though not in the form of metallic iron, but in the state or condition of an oxyd of iron. When metallic iron is exposed to air and moisture, it becomes rough, and covered with reddish or brown scales. This is what is called, in common language, *rust of iron*, the process is called *rusting*. In Chemical language, it is called the *oxydation* of iron, and the product an *oxyd of iron*. There are three oxyds of Iron; when in soils, it is generally in the condition of peroxyd, or its highest degree of oxydation, and gives a reddish or brown color to them. It is this which gives our red and yellow clay soils their peculiar color, and frequently also tinges sand—which, thus colored, is called Ferruginous sand. It has several important uses in the soil.

First.—It is one of the necessary constituents of the human body, being always found in the blood of healthy persons. From the impossibility of its existence in the air, we know that the body must be supplied with it from the food which it consumes; but the plants used for food, can no more obtain it from the *air*, than animals can, hence they must obtain it from the soil, and it is therefore a necessary constituent of soils.

Not only is it itself food for plants, but it is a gatherer of food for them from the atmosphere.

Baron Liebig, one of the ablest writers on Agricultural Chemistry, of this or any other day, though overlooking the first use of iron in a soil, so clearly and satisfactorily explains the second, that I cannot do better than use his own words:

* “Peroxyd of iron and alumina,” says this able and eloquent writer, “are distinguished from all other metallic oxyds,) i. e. rusts of metals,) by their power of forming solid compounds with

* Chemistry, in its Application to Agriculture and Physiology. (Edited by Lyon Playfair and Dr. Gregory, 4th London Edition.